



(51) International Patent Classification:
B64G 1/64 (2006.01)

(21) International Application Number:
PCT/US2020/013517

(22) International Filing Date:
14 January 2020 (14.01.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/792,779 15 January 2019 (15.01.2019) US

(71) Applicant: **NORTHROP GRUMMAN INNOVATION SYSTEMS, INC.** [US/US]; 4700 Nathan Lane, Plymouth, Minnesota 55442 (US).

(72) Inventors: **NICHOLSON, James Garret**; 22131 Whisperhill Court, Broadlands, Virginia 20148 (US). **TREACHLER, Daniel Carl**; 1111 Janney Street SW, Leesburg, Virginia 20175 (US). **ORTIZ, Oliver Benjamin**; 4810 Garrett Ave., Beltsville, Maryland (US). **REAVILL, James Dulin**; 302 Old York Road, Irving, Texas 75063 (US). **HEK-**

MAN, Benjamin Michael; 19871 Telegraph Springs Road, Percellville, Virginia 20132 (US). **SULLIVAN, Robert Bryan**; 3620 Beech Down Drive, Chantilly, Virginia 20151 (US). **NIEDERSTRASSER, Carlos Guillermo**; 10860 Grovehampton Court, Reston, Virginia 20194 (US). **LIEBERBAUM, Mark**; 2501 9th Road South Apt. 322, Arlington, Virginia 22204 (US). **GLOGOWSKI, Michael Joseph**; 18856 Ridgeback Court, Leesburg, Virginia 20176 (US). **LLORENS, William A**; 412 Madison Forest Drive, Herndon, Virginia 20170 (US). **CHOW, Kenneth Siu-Kin**; 10100 Squires Trail, Great Falls, Virginia 22066 (US).

(74) Agent: **WALKOWSKI, Joseph A.** et al.; P.O. Box 2550, Salt Lake City, Utah 84110 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

(54) Title: SPACECRAFT SERVICING DEVICES AND RELATED ASSEMBLIES, SYSTEMS, AND METHODS

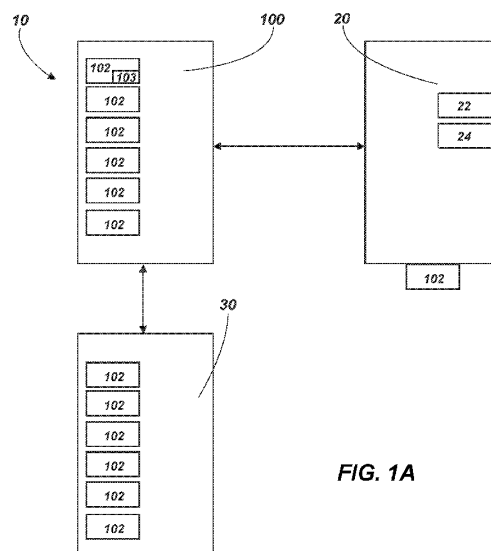


FIG. 1A

(57) Abstract: Spacecraft servicing devices or pods and related methods may be configured to be deployed from a carrier spacecraft and include at least one spacecraft servicing component configured to perform at least one servicing operation on the target spacecraft. The spacecraft servicing devices may be configured to be transported from an initial orbit to another orbit after the spacecraft servicing device is deployed from the carrier spacecraft.

[Continued on next page]

SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*